

I claim:

1. An ionically conductive ceramic element comprising: 40  
a plurality of tubes each having interior and exterior  
surfaces, and each having a closed end and an open  
end;

a tube support member receiving open ends of said  
plurality of tubes; 45

a first electrically conductive coating covering said exte-  
rior surfaces of said plurality of tubes;

a second electrically conductive coating covering said  
interior surfaces of said plurality of tubes; and 50

said ionically conductive ceramic element having at least  
two columns and a first electrode covering an exterior  
surface of said first column and an interior surface of  
said second column of tubes and a second electrode  
covering an exterior surface of said second column of 55  
tubes and an interior surface of said first column of  
tubes;

said first electrode being connectable to a source of  
electrical potential at a first polarity and said second  
electrode being connectable to a source of electrical 60  
potential at a second polarity.

2. The ceramic element described in claim 1 wherein said  
plurality of tubes are formed into rows and columns on said  
tube support member wherein each tube is connected to said  
first electrode and said second electrode and first and second  
electrode portions of each of said tubes in a column are  
electrically connected in parallel and wherein each of the  
tubes forming a row are electrically connected in series.

3. The ceramic element described in claim 2 wherein said  
5 first and second electrodes are formed by

cuts in said first and second electrically conductive coat-  
ings between said columns of tubes, said cuts extending  
longitudinally of and between the columns of tubes so  
that the portions of said first and second electrodes on  
10 opposite sides of each said cut are electrically  
separated, vias extended through said first and second  
surfaces adjacent each of said tubes and

15 electrical connections extending through said vias con-  
necting a first electrode portion of each said tube in a  
row to a second electrode portion of a tube in an  
adjacent column in the same row to form a series  
connection across each row of tubes.

4. The ceramic element described in claim 3 wherein said  
20 electrical connections are constituted by the material form-  
ing said first and second electrodes coating the surfaces of  
said ceramic electrolyte extending through said vias.

5. The ceramic element described in claim 1, wherein  
each the plurality of tubes is spaced from adjacent tubes. 25

6. An oxygen generator, comprising:

a first ceramic element having a tube support member and  
an array of tube members extending from said tube  
support member and formed into columns and rows;

30 a second ceramic element adjacent said first ceramic  
element; and

a seal between said first ceramic element and said second  
ceramic element;

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35 said first ceramic element having at least two columns and  
a first electrode covering an exterior surface of said first  
column and an interior surface of said second column  
of tubes and a second electrode covering an exterior  
surface of said second column of tubes and an interior  
surface of said first column of tubes;

40 said first electrode being connectable to a source of  
electrical potential at a first polarity and said second  
electrode being connectable to a source of electrical  
potential at a second polarity.

45 7. The oxygen generator of claim 6, wherein said first  
ceramic element includes a first electrically conductive  
coating covering exterior surfaces of each of said plurality of  
tube members; and

50 wherein said first ceramic element includes a second  
electrically conductive coating covering interior sur-  
faces of said plurality of tube members.

8. The oxygen generator of claim 6, wherein said first  
ceramic element is integrally formed.

9. An electrochemical element, comprising:

55 a ceramic element having a tube support member and an  
array of tube members extending from said tube sup-  
port member;

wherein said tube support member and said array of tube  
members are formed from ceramic.

60 10. The electrochemical element of claim 9, wherein said  
ceramic element is an electrolyte.

11. The electrochemical element of claim 9, wherein said  
ceramic element is integrally formed.

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